Amendments to the Claims:

This listing of the claims will replace all prior versions, and listings, of the claims in the application:

1. (Currently amended) A method of determining range of a radar target comprising:

receiving signal samples based on returns of a target during tracking;

processing the signal samples to produce a wideband envelope range estimate for components of target motion comprising precession and spin motion components;

measuring the signal samples to produce ambiguous phase values;

providing an integer number of cycles in phase change estimate;

adding said estimate with two pi with a result added to said ambiguous phase values to provide a phase value;

differencing said phase value with the wideband envelope range estimate to provide an error signal; and

differencing [using each] the wideband envelope range estimate [and ambiguous phase value] with the error signal to produce an unambiguous phase value indicative of range.

2. (Original) The method of claim 1, further comprising:

determining an estimate of ballistic trajectory for the signal samples; and

removing the estimated ballistic trajectory during processing.

3. (Original) The method of claim 1 wherein processing operates at a sampling rate that is at least twice the frequency of the spin motion components.

4. (Canceled)

5. (Currently amended) The method of claim [4] 1 further comprising:

determining a magnitude of the error value and

adjusting resources of a radar system that performs the tracking to ensure that the magnitude of the error is less than a one sigma error.

6. (Original) The method of claim 5 wherein the radar system resources comprise signal-to-noise ratio.

7. (Original) The method of claim 6 wherein the radar system resources further comprise data rate.

8. (Currently Amended) [The method of claim 4] A method of determining range of a radar target comprising:

receiving signal samples based on returns of a target during tracking;

processing the signal samples to produce a wideband envelope range estimate for components of target motion comprising precession and spin motion components;

measuring the signal samples to produce ambiguous phase values;

using each wideband envelope range estimate and ambiguous phase value to produce an unambiguous phase value indicative of range wherein using comprises:

subtracting the measured ambiguous phase from the wideband envelope range estimate to produce an error value associated with the wideband envelope range estimate; and

subtracting the error value from the wideband envelope range estimate to give the unambiguous phase value;

determining an estimate of ballistic trajectory for the signal samples;

removing the estimated ballistic trajectory during processing; and

wherein processing comprises:

producing a spectrum of wideband envelope range estimates from the signal samples;

transforming the wideband envelope range estimates to obtain a spectral estimate of each motion component of precession, spin, spin plus precession and spin minus precession;

detecting each motion component;

estimating amplitude, frequency and phase for each motion component spectral estimate; and

forming a sinusoid in range motion from the estimate of amplitude, frequency and phase for each motion component spectral estimate.

9. (Currently amended) The method of claim [6] 8 wherein processing occurs in batch mode for signal samples obtained during several cycles of precession motion.

10. (Currently amended) The method of claim [6] 8 wherein the signal samples comprise pulses and using further comprises:

using the sinusoid in range motion to determine an integer number k of cycles in phase change between the pulses.

11. (Original) The method of claim 8 wherein using further comprising adding $2\pi k$ to the measured ambiguous phase value prior to subtracting the measured ambiguous phase value from the wideband envelope range estimate.

12. (Canceled)

13. (Currently amended) An apparatus for determining range of a radar target [comprising] comprising:

means for processing the signal samples based on returns of a target during tracking to produce a wideband envelope range estimate for components of target motion comprising precession and spin motion components;

means for measuring the signal samples to produce ambiguous phase values;

means for providing an integer number of cycles in phase change estimate;

means for adding said estimate with two pi with a result added to said ambiguous phase values to provide a phase value;

means for differencing said phase value with the wideband envelope range estimate to provide an error signal; and

means for [using each] differencing the wideband envelope range estimate [and ambiguous phase value] with the error signal to produce an unambiguous phase value indicative of range.

14. (Currently amended) A system comprising:

a transmitter/receiver to direct transmit signals to and receive return signals from a target;

a processor to process the return signals as in-phase and quadrature samples to produce angle information and range signals;

a tracker to track a target detected according to results of the processing by the first processor, the tracker measuring range data during tracking and estimating a ballistic trajectory therefrom; and

a unit operable to [use] provide a wideband envelope range estimate of the in-phase and quadrature samples [, the ballistic trajectory estimate] and an ambiguous phase measurement of the in-phase and quadrature samples, to provide an integer number of cycles in phase change estimate to add with two pi with a result added to said ambiguous phase values to provide a phase value, to difference said phase value with the wideband envelope range estimate to provide an error signal, and to difference the wideband envelope range estimate with the error signal to produce a range measurement that is unambiguous in phase.